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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ALCALA, JOSE H

ART UNIT PAPER NUMBER

2827

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/342,584

Applicant(s)

APPELT ET AL.

Examiner

Jose H Alcalá

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-48 is/are pending in the application.
- 4a) Of the above claim(s) 11, 16-18, 24-36 and 39-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 12-15, 19-23, 37, 38 and 48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. The following action is a Final Rejection, in response to the paper filed on 2/10/03.

Drawings

2. The drawings are objected to because Figures are improperly crosshatched. All of the parts shown in the section, and only those parts, must be crosshatched. The crosshatching patterns should be selected from those shown on page 600-81 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP 608.02. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3,6,8 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukada et al. (US Patent NO. 5,451,721).

Regarding Claim 1, Tsukada teaches a printed circuit board comprising: a substrate layer (Reference number 10) comprising impregnated glass fibers; a non-conductive layer (combination of Reference numbers 18,22,28) comprising a

dielectric material free of continuous glass fibers (Reference number 18); and an electrically conductive circuitry (Reference number 44) comprising a conductive material formed on said non-conductive layer such that said non-conductive layer lies between said substrate layer and said conductive material.

The recitations: "for use in an electronic device package" and "to prevent shorts there between caused by migration of said conductive material along said glass fibers" are intended use limitations, and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

Regarding Claim 2, Tsukada teaches a plated through hole (Reference number 38) extending through said substrate layer and said non-conductive layer and electrically coupled to said circuitry.

Regarding Claim 3, Tsukada teaches that the dielectric material comprises a photoimageable dielectric material (column 2, lines 66-68).

Regarding Claim 6, Tsukada teaches that the dielectric material is a resin (Reference number 18) coating a copper foil (Reference number 16).

Regarding Claim 8, as best understood by the examiner Tsukada teaches at least one clearance (the space between reference numbers 40 and 38) between said electrically conductive circuitry and said plated through hole filled with said dielectric material.

5. Claims 48,10,12-15,19,22 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukada et al. (US Patent NO. 5,451,721).

Regarding Claim 48, Tsukada teaches an electronic device package (device of Figure 2I) comprising: a substrate (Reference number 10) comprising impregnated glass fibers; an electrically conductive circuit (Reference numbers 40,42); and a non-conductive layer (combination of Reference numbers 18,22,28) comprising a dielectric material free of continuous glass fibers (Reference number 18) applied to said substrate such that said non-conductive layer lies between said substrate and said electrically conductive circuit (See Figure 2I).

The recitation: "to prevent shorts there between caused by migration of said electrically conductive circuit along said glass fibers" is an intended use limitation, and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

Regarding Claim 10, Tsukada teaches at least one power plane (Reference number 44).

Regarding Claim 12, Tsukada teaches at least one plated through hole (Reference number 38) extending through said substrate and said non-conductive layer.

Regarding Claim 13, as best understood by the examiner Tsukada teaches that said power plane (Reference number 44) is spaced from said through hole (See figure 38) and said board includes a non-conductive layer comprising a dielectric material free

of continuous glass fibers in the space between said power plane and said through hole. The recitation "to prevent a short there between" is merely an intended use of the non-conductive layer, and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

Regarding Claim 14, Tsukada teaches that the non-conductive layer is positioned between said through hole and said electrically conductive circuit (See figure 2I).

Regarding Claim 15, Tsukada teaches at least one clearance (the space between reference numbers 40 and 38) filled with said dielectric material (See Figure 2I)

Regarding Claims 19, Tsukada teaches that the dielectric material comprises a photoimageable dielectric material (olumn 2, lines 66-68).

Regarding Claim 22, Tsukada teaches that the dielectric material comprises resin-coated copper foil (Reference number 18, coating Reference number 16).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4,5 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukada et al. (US Patent No. 5,451,721).

Regarding Claims 4 and 5, Tsukada teaches all the limitations of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that the dielectric material comprises a polyimide, or a Kevlar-based paper impregnated with epoxy resin. The use of a polyimide and Kevlar-based paper impregnated with epoxy resin, as dielectric material of a printed circuit board is well known in the art. Both materials are well used in the art for their excellent dielectric properties. It would have been obvious to one of ordinary skill in the art at the time of the invention, to use any of these two materials as the material of the dielectric, to achieve the desired dielectric characteristic for the printed circuit board. In addition it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 37, Tsukada teaches all the limitations of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that the thickness of said non-conductive layer is between 0.5 mils and 5 mils. It is well known in the art to make the layers of a printed circuit board as small as possible, to improve integration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the thickness of the non-conductive layer in order to improve integration. In addition it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See In re Aller, 105 USPQ 233.

8. Claims 20,21 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukada et al. (US Patent No. 5,451,721).

Regarding Claims 20 and 21, Tsukada teaches all the limitations of the instant claimed invention as stated supra for claim 48, but fails to explicitly teach that the dielectric material comprises a polyimide, or a Kevlar-based paper impregnated with epoxy resin. The use of a polyimide and Kevlar-based paper impregnated with epoxy resin, as dielectric material of a printed circuit board is well known in the art. Both materials are well used in the art for their excellent dielectric properties. It would have been obvious to one of ordinary skill in the art at the time of the invention, to use any of these two materials as the material of the dielectric, to achieve the desired dielectric characteristic for the printed circuit board. In addition it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim 38, Tsukada teaches all the limitations of the instant claimed invention as stated supra for claim 48, but fails to explicitly teach that the thickness of said non-conductive layer is between 0.5 mils and 5 mils. It is well known in the art to make the layers of a printed circuit board as small as possible, to improve integration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the thickness of the non-conductive layer in order to improve integration. In addition it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See In re Aller, 105 USPQ 233.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukada et al. (US Patent No. 5,451,721) in view of Pellegrino (US Patent No. 4,521,262).

Regarding Claim 7, Tsukada teaches all the limitations of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that said substrate layer is prepreg comprising a glass fabric impregnated with epoxy resin. Pellegrino teaches a substrate layer that is prepreg comprising a glass fabric impregnated with epoxy resin (Column 4, lines 60-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Tsukada and Pellegrino in order to have a substrate layer that is prepreg comprising a glass fabric impregnated with epoxy resin, thus making it easy and fast to mass produce the substrate ready for component connections.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukada et al. (US Patent No. 5,451,721) in view of Pellegrino (US Patent No. 4,521,262).

Regarding Claim 7, Tsukada teaches all the limitations of the instant claimed invention as stated supra for claim 48, but fails to explicitly teach that said substrate layer is prepreg comprising a glass fabric impregnated with epoxy resin. Pellegrino teaches a substrate layer that is prepreg comprising a glass fabric impregnated with epoxy resin (Column 4, lines 60-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Tsukada and Pellegrino in order to have a substrate layer that is prepreg comprising a glass fabric impregnated with epoxy resin, thus making it easy and fast to mass produce the substrate ready for component connections.

Response to Arguments

11. Applicant's arguments, see page 2, lines 1-24 of Remarks, filed 2/10/03, with respect to rejection of claims 8, 13 and 15, under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The rejection under 35 U.S.C. 112 of claims 8, 13 and 15 has been withdrawn.

12. Applicant's arguments filed 2/10/03 have been fully considered but they are not persuasive.

Regarding Claims 1 and 48, applicant argues that the examiner is wrong in characterizing the combination of Reference numerals 18, 22, 28 of Tsukada et al., as "a non-conductive layer... comprising a dielectric material free of continuous glass fibers", because a major component of the three part layer is electrically connected to another component, so that this three part layer cannot be characterized as (a) non-conductive and the same as Applicant's non-conductive layer (b) that is not electrically connected to anything. Applicant further argues that one skilled in the art would not refer to the examiner's three part layer as being non-conductive. The examiner respectfully disagrees with the argument, and states that the recitation "dielectric material", is a label to describe a layer that can have different parts, elements or materials, but which serves the function of reducing or "eliminating" the conduction of "direct electric current". It is very common and well known in the art, the use of prepreg laminated with copper (known as C-stage), which regardless of the good conductive characteristics of the copper, the material as a whole is dielectric in nature. In the Tsukada invention we have a laminate of dielectric and copper, which is not structurally different from the device as

claimed in the present application. If the supposed difference between the Tsukada invention and the present application as claimed, is directed to the method of fabrication of the dielectric layer, it is pointed out that the manner in which a device was made, is a product by process limitation. If the product in the product-by-process claims are the same as or obvious from a product of the prior art, the claims are unpatentable even though the prior product was made by a different process. See *In re Thorpe*, 227 USPQ 964,966 (Fed.Cir 1985). A "product by process" claim is directed to the product per se, no matter how actually made, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

As per applicant's argument that claims 6 and 22, are patentable over Tsukada et al. for the additional reason that Tsukada et al., fails to teach or suggest that the "dielectric material is resin coated copper foil", it is pointed out that the limitations regarding the manner in which a device was made, are not sufficient for being given patentable weight, as stated supra for claims 1 and 48.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose H Alcala whose telephone number is (703) 305-9844. The examiner can normally be reached on Monday to Friday.

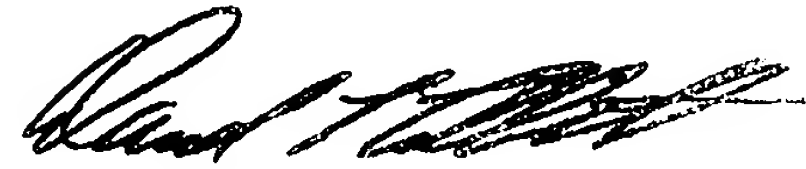
15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

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16. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JHA
June 11, 2003



DAVID L. TALBOTT
SENIOR PATENT EXAMINER
TECHNOLOGY CENTER 2800